

08/581347

FILE 'USPAT' ENTERED AT 16:50:48 ON 17 JAN 1998

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* U.S. PATENT TEXT FILE *

=> e cleeves, j?/in

=> s e4

L1 12 "CLEEVE, JAMES M"/IN

=> d l1 1-12

1. 5,693,556, Dec. 2, 1997, Method of making an antifuse metal post structure; **James M. Cleeves**, 257/50, 530 :IMAGE AVAILABLE:

2. 5,686,223, Nov. 11, 1997, Method for reduced pitch lithography; **James M. Cleeves**, 430/312, 315, 330, 394 :IMAGE AVAILABLE:

3. 5,652,182, Jul. 29, 1997, Disposable posts for self-aligned non-enclosed contacts; **James M. Cleeves**, 438/631, 632, 637, 698, 699, 702 :IMAGE AVAILABLE:

4. 5,652,084, Jul. 29, 1997, Method for reduced pitch lithography; **James M. Cleeves**, 430/315, 313, 328, 330 :IMAGE AVAILABLE:

5. 5,573,971, Nov. 12, 1996, Planar antifuse and method of fabrication; **James M. Cleeves**, 438/600, 643 :IMAGE AVAILABLE:

6. 5,366,929, Nov. 22, 1994, Method for making reliable selective via fills; **James M. Cleeves**, et al., 438/644; 148/DIG.158; 438/654, 675, 696, 906 :IMAGE AVAILABLE:

7. 5,091,047, Feb. 25, 1992, Plasma etching using a bilayer mask; **James M. Cleeves**, et al., 438/704; 204/192.37; 430/313, 317, 438/720, 723, 945 :IMAGE AVAILABLE:

8. 5,045,150, Sep. 3, 1991, Plasma etching using a bilayer mask; **James**
M. Cleeves, et al., 438/717, 703, 704, 720 :IMAGE AVAILABLE:

9. 4,883,772, Nov. 28, 1989, Process for making a self-aligned silicide shunt; **James M. Cleeves**, et al., 148/DIG.19, DIG.105; 257/586, 588, 754; 438/345, 621 :IMAGE AVAILABLE:

10. 4,806,504, Feb. 21, 1989, Planarization method; **James M.**
Cleeves, 438/699; 427/240, 401; 438/780, 782 :IMAGE AVAILABLE:

11. 4,489,482, Dec. 25, 1984, Impregnation of aluminum interconnects with copper; Thomas Keyser, et al., 438/658, 257/750; 438/661 :IMAGE AVAILABLE:

12. 4,443,295, Apr. 17, 1984, Method of etching refractory metal film on semiconductor structures utilizing triethylamine and H.sub.2

O.sub.2;

Kenneth J. Radigan, et al., 438/754; 134/2; 252/79.1 :IMAGE AVAILABLE:

=> d l1 1-12 ti,ab

US PAT NO: 5,693,556 :IMAGE AVAILABLE: L1: 1 of 12

TITLE: Method of making an antifuse metal post structure

ABSTRACT:

A method of forming an antifuse device. According to the preferred method of the present invention, a first metal layer comprising a first bulk conductive layer and the top capping layer is formed. Next, the capping layer is etched into a first patterned capping layer. An antifuse layer is then formed over the patterned capping layer and over the first bulk conductive layer. Next, a second metal layer comprising a bottom barrier layer and a second bulk conductive layer is formed on the antifuse layer.

The second metal layer and the antifuse layer are then etched to form a metal post on the capping layer. The first bulk conductive layer is then etched in alignment with the patterned capping layer to form a first metal interconnect.

US PAT NO: 5,686,223 :IMAGE AVAILABLE: L1: 2 of 12

TITLE: Method for reduced pitch lithography

ABSTRACT:

A lithographic patterning process uses multiple exposures to provide for relatively reduced pitch for features of a single patterned layer. A first imaging layer is exposed to radiation in accordance with a first pattern and developed. The resulting patterned layer is stabilized. A second imaging layer is subsequently formed to surround the first patterned layer, exposed to radiation in accordance with a second pattern, and developed to form a second patterned layer. As the first patterned layer has been stabilized, the first patterned layer remains with the second patterned layer to produce a single patterned layer. For another embodiment, a single imaging layer is patterned by exposure to radiation in accordance with two separate patterns. An exposed portion of the imaging layer is suitably stabilized to withstand subsequent lithographic process steps.

US PAT NO: 5,652,182 :IMAGE AVAILABLE: L1: 3 of 12

TITLE: Disposable posts for self-aligned non-enclosed contacts

ABSTRACT:

A disposable post process for contact openings to interconnect material of reduced geometry and no enlarged landing pads is disclosed. A layer of material is formed over interconnect regions on a semiconductor wafer and subsequently patterned into posts which define the location and shape of openings to be formed in a subsequently formed planar layer. After a layer is formed to surround the posts, the posts are removed to create openings in the layer above underlying interconnect regions. These openings may then be used to form suitable contacts to the interconnect regions.

US PAT NO: 5,652,084 :IMAGE AVAILABLE: L1: 4 of 12
TITLE: Method for reduced pitch lithography

ABSTRACT:

A lithographic patterning process uses multiple exposures to provide for relatively reduced pitch for features of a single patterned layer. A first imaging layer is exposed to radiation in accordance with a first pattern and developed. The resulting patterned layer is stabilized. A second imaging layer is subsequently formed to surround the first patterned layer, exposed to radiation in accordance with a second pattern, and developed to form a second patterned layer. As the first patterned layer has been stabilized, the first patterned layer remains with the second patterned layer to produce a single patterned layer. For another embodiment, a single imaging layer is patterned by exposure to radiation in accordance with two separate patterns. An exposed portion of the imaging layer is suitably stabilized to withstand subsequent lithographic process steps.

US PAT NO: 5,573,971 :IMAGE AVAILABLE: L1: 5 of 12
TITLE: Planar antifuse and method of fabrication

ABSTRACT:

A method of forming an antifuse. A first conductive layer is deposited over a substrate. Next, a capping layer is deposited onto the conductive layer. An antifuse layer is then deposited onto the capping layer. A barrier layer is then deposited onto the antifuse layer. Next, the first conductive layer, the capping layer, the antifuse layer, and the barrier layer are patterned into a metal stack. A disposable post is then formed on the barrier layer of the patterned metal stack. The barrier layer and the antifuse layer are then etched substantially in alignment with the disposable post to leave a first metal interconnect. Next, an insulating layer is formed over the substrate including the first metal interconnect and the disposable post wherein the insulating layer is made substantially planar with the disposable post. The disposable post is then removed to form an aperture in the insulating layer. A second conductive layer is then deposited into the aperture and onto the barrier layer.

US PAT NO: 5,366,929 :IMAGE AVAILABLE: L1: 6 of 12
TITLE: Method for making reliable selective via fills

ABSTRACT:

A process for filling vias formed in a dielectric layer is disclosed. First, a via is formed in a dielectric layer, exposing an underlying metallization layer having a seed layer thereon. A sputter etch is performed which removes a portion of the seed layer, including an oxidized surface layer. The material thus etched from the seed layer first seals the sidewall of via, preventing outgassing from occurring. The continued redeposition of the seed layer on the sidewall provides a nucleation site for selective deposition of a via fill material. Following the sputter etch, selective deposition of the via fill is performed. Since the deposition occurs from the sidewalls as well as on the bottom of the via, all vias become substantially filled at the same time.

US PAT NO: 5,091,047 :IMAGE AVAILABLE: L1: 7 of

12
TITLE: Plasma etching using a bilayer mask

ABSTRACT:

A bilayer mask is utilized for etching a primary layer, which may be either an aluminum metallization layer or a dielectric layer. The bilayer mask includes both a thin resist layer and a metal imaging layer. The thin resist layer provides for high resolution patterning of the metal imaging layer. The metal imaging layer, in turn, provides for durability to withstand subsequent plasma etching of the underlying primary layer.

US PAT NO: 5,045,150 :IMAGE AVAILABLE: L1: 8 of 12
TITLE: Plasma etching using a bilayer mask

ABSTRACT:

A bilayer mask is utilized for etching a primary layer, which may be either an aluminum metallization layer or a dielectric layer. The bilayer mask includes both a thin resist layer and a metal imaging layer. The thin resist layer provides for high resolution patterning of the metal imaging layer. The metal imaging layer, in turn, provides for durability to withstand subsequent plasma etching of the underlying primary layer.

US PAT NO: 4,883,772 :IMAGE AVAILABLE: L1: 9 of 12
TITLE: Process for making a self-aligned silicide shunt

ABSTRACT:

A silicide base shunt 50 and method of fabricating it are disclosed for a bipolar transistor. The base shunt 50 is fabricated using the first layer metal 36, 39 as a mask to etch silicon dioxide 27 surrounding the emitter 34 to thereby expose the underlying silicon epitaxial layer 24. Nickel or copper are then deposited onto the silicon 24 to form a region of silicide 50 extending from a base contact 36 to closely proximate the emitter 34, thereby minimizing the resistance of the extrinsic base region 24 of the transistor.

US PAT NO: 4,806,504 :IMAGE AVAILABLE: L1: 10 of 12
TITLE: Planarization method

ABSTRACT:

A liquid polymeric resin is applied over an irregular surface of a semiconductor substrate by first spinning followed by rotation of the substrate about an axis parallel to and spaced-apart from the plane of the substrate. Such a technique provides for planarization layer having enhanced planarity. When applied over an underlying insulating layer, the planarization layer will typically be etched back in order to planarize the insulating layer. Alternatively, the planarization layer may be formed directly over the semiconductor substrate, and an insulating layer formed over the planarization layer. In either case, the substrates are then ready for subsequent processing according to well known techniques, typically the formation of metallization layers over the insulating layer.

US PAT NO: 4,489,482 :IMAGE AVAILABLE: L1: 11 of 12
TITLE: Impregnation of aluminum interconnects with copper

ABSTRACT:

A method for impregnating copper into aluminum interconnect lines on a semiconductor device is disclosed. In a first embodiment, an interconnect pattern is formed on an aluminum layer by etching while the aluminum is substantially free from copper, and the copper is thereafter introduced to the formed interconnect lines. In a second embodiment, copper is introduced to the aluminum layer prior to formation of the desired interconnect pattern. The copper-rich layer is removed from the areas to be etched prior to etching. The method facilitates chlorine plasma etching of the aluminum which is inhibited by the presence of copper. The method is also useful with various wet etching processes where the formation of a copper-rich layer is found to stabilize the aluminum layer during subsequent processing.

US PAT NO: 4,443,295 :IMAGE AVAILABLE: L1: 12
of 12

TITLE: Method of etching refractory metal film on
semiconductor
structures utilizing triethylamine and H₂O₂

ABSTRACT:

A method is disclosed of etching a refractory metal layer on a semiconductor structure comprising subjecting it to a mixture of a Lewis base and an oxidizing agent. In the preferred embodiment a method is described for etching a tungsten-titanium layer on a semiconductor structure by immersing it in a mixture of triethylamine and hydrogen peroxide.

=> s holding body and aperture? abd seal?
L2 0 HOLDING BODY AND APERATURE? ABD SEAL?

=> s aperture and conductivity
L3 202 APERATURE AND CONDUCTIVITY

=> s l3 and heat transferring seal
L4 0 L3 AND HEAT TRANSFERRING SEAL

=> s l3 and seal
258143 SEAL
L5 66 L3 AND SEAL

=> s l5 and (thermal or heat)
L6 55 L5 AND (THERMAL OR HEAT)

=> s l6 and adhesive
188526 ADHESIVE
L7 13 L6 AND ADHESIVE

=> d l7 1-13

1. 5,353,798, Oct. 11, 1994, Intravascular imaging apparatus and methods
for use and manufacture; Wayne Sieben, 600/462, 459, 585
:IMAGE
AVAILABLE:

2. 5,250,843, Oct. 5, 1993, Multichip integrated circuit modules;
Charles W. Eichelberger, 257/692, 687, 693 :IMAGE
AVAILABLE:

3. 5,144,412, Sep. 1, 1992, Process for manufacturing plastic pin
grid arrays and the product produced thereby; Kin-Shiung Chang, et al.,

257/665, 706, 786; 361/706, 783 :IMAGE AVAILABLE:

4. 5,125,431, Jun. 30, 1992, Thermoplastic water manifold and
method of
making same; James D. Vogel, et al., 137/561A; 285/21.1, 197
:IMAGE
AVAILABLE:

5. 5,072,743, Dec. 17, 1991, Barrierized cigarette; Charles P.
Perrine,
131/360, 365 :IMAGE AVAILABLE:

6. 4,965,227, Oct. 23, 1990, Process for manufacturing plastic pin
grid
arrays and the product produced thereby; Kin-Shiung Chang, et al.,
29/827; 174/50.51; 206/347; 361/718, 783; 438/112, 122, 123
:IMAGE
AVAILABLE:

7. 4,919,637, Apr. 24, 1990, Model submarine; Lewis W.
Fleischmann,
446/162; 114/333; 446/155, 164, 211 :IMAGE AVAILABLE:

8. 4,827,872, May 9, 1989, Animal shelter; William R. Sommers,
119/482,
500 :IMAGE AVAILABLE:

9. 4,627,903, Dec. 9, 1986, Electrode for an electrostatic atomizing
device; Alan T. Chapman, et al., 204/275; 75/232; 204/291, 293;
239/704;
361/228; 419/33 :IMAGE AVAILABLE:

10. 4,398,879, Aug. 16, 1983, On-site fabricating of plastic pipe
fittings; Paul R. DuPont, et al., 425/392 :IMAGE AVAILABLE:

11. 4,220,813, Sep. 2, 1980, Terminal for medical instrument;
James C.
Kyle, 174/152GM; 607/37 :IMAGE AVAILABLE:

12. 4,064,740, Dec. 27, 1977, Apparatus and method for measuring
permeability; Edward Lewis Crosby, Jr., 73/38 :IMAGE
AVAILABLE:

13. 3,810,509, May 14, 1974, CROSS FLOW **HEAT**
EXCHANGER; Leslie C.
Kun, 165/148; 29/890.039; 165/153, DIG.376 :IMAGE
AVAILABLE:

=> d l7 1-13 ti,ab

US PAT NO: 5,353,798 :IMAGE AVAILABLE: L7: 1 of
13
TITLE: Intravascular imaging apparatus and methods for use
and
manufacture

ABSTRACT:

A device for ultrasonic imaging, and methods for the use an
manufacture
thereof, particularly of small coronary vessels. The device comprises
an
elongate member with a distal end that can be positioned within a
small
vessel of a patient's body while a proximal end is located outside the
body, a transducer located at a distal end of the elongate member and
operable to scan the distal coronary vessels with ultrasonic pulses,
and
a signal processor connected to a proximal end of the elongate
member and
to the transducer for generating and receiving pulses to and from the
transducer. A motor may be also connected to the proximal end of the

elongate member for rotating the transducer.

US PAT NO: 5,250,843 :IMAGE AVAILABLE: L7: 2 of
13
TITLE: Multichip integrated circuit modules

ABSTRACT:

A multichip integrated circuit package comprises a substrate having a flat upper surface to which is affixed one or more integrated circuit chips having interconnection pads. A polymer encapsulant completely surrounds the integrated circuit chips. The encapsulant is provided with a plurality of via openings therein to accommodate a layer of interconnection metallization. The metallization serves to connect various chips and chip pads with the interconnection pads disposed on the chips. In specific embodiments, the module is constructed to be repairable, have high I/O capability with optimal **heat** removal, have optimized speed, be capable of incorporating an assortment of components of various thicknesses and function, and be hermetically sealed with a high I/O count. Specific processing methods for each of the various module features are described herein, along with additional structural enhancements.

US PAT NO: 5,144,412 :IMAGE AVAILABLE: L7: 3 of
13
TITLE: Process for manufacturing plastic pin grid arrays and the product produced thereby

ABSTRACT:

A pin grid array package is provided. An array of terminal pins pass through apertures formed in an interconnect tape. The terminal pins are electrically connected to circuit traces formed on interconnect tape. The electrically conductive bond between the terminal pins and circuit traces is either by a mechanical cinch by soldering. In one embodiment, at least a portion of the interconnect tape, terminal pins and a **heat** sink are embedded in a molding polymer resin.

US PAT NO: 5,125,431 :IMAGE AVAILABLE: L7: 4 of
13
TITLE: Thermoplastic water manifold and method of making same

ABSTRACT:

A novel thermoplastic manifold and thermoplastic fluid fittings for the distribution of fluids, such as pressurized carbonated water, has an elongate tubular thermoplastic conduit with a plurality of apertures spaced along its length for receiving the thermoplastic fittings. Each fitting has a spud extending from one end thereof with a sonic energy director around the perimeter thereof. The fittings also include a saddle portion having a pair of arcuate sonic energy directing ridges thereon spaced on each side of the spud. Each fitting is fastened and sealed to the conduit by the sonic welding of the spud perimeter to the conduit aperture perimeter followed by the sonic welding of the saddle to the exterior surface of the tube.

US PAT NO: 5,072,743 :IMAGE AVAILABLE: L7: 5 of
13
TITLE: Barrierized cigarette

ABSTRACT:

Differentiation of surface is utilized for the prevention or arrest of forward finger edge slippage along the surface of a cigarette under new perception and consideration of all significant factors, including the human factor. Provision is sometimes included for automatic extinguishing of the cigarette or destruction of its smokable utility prior to dissipation of the means against slippage. A cigarette is manufactured having predetermined control against its being smoked or burned the full length of its tobacco content. Means employed are varying adaptations of physics and chemistry but basic is either the principle of smothering or the utilization of combustion itself, or its product **heat**, in self defeating adaptation.

US PAT NO: 4,965,227 :IMAGE AVAILABLE: L7: 6 of
13
TITLE: Process for manufacturing plastic pin grid arrays and the product produced thereby

ABSTRACT:

A process for forming an integrated circuit pin grid array package comprising a flexible metal tape adapted for use in tape automated bonding with a plurality of holes. Terminal pins are inserted in the holes and the tapes and pins are disposed within a mold so that a cavity is formed about the pins and tape. The cavity is filled with a polymer resin so as to at least partially surround and support the pins and tape and thereby form the plastic encapsulated pin grid array.

US PAT NO: 4,919,637 :IMAGE AVAILABLE: L7: 7 of
13
TITLE: Model submarine

ABSTRACT:

A model submarine has an inherent "fail safe" feature, so that the submarine (if submerged) will rise to its periscope depth in the event the submarine encounters a stationary object, or in the event a power failure occurs. Power is supplied by a single submersible motor-pump unit within a free-flooding hull. The motor-pump unit supplies a pressurized water discharge for, first, forward propulsion of the submarine via the discharge nozzle of an ejector pump; and second, for hydraulic control of the diving and steering maneuvers. The ejector pump has a venturi for aspirating fluid out of the ballast tank. An automatic depth control feature assures that the submarine will level off to a desired predetermined depth when a diving command signal is given; and the desired predetermined depth is adjustable. The model submarine simulates its real-life counterpart, may be enjoyed by the sophisticated hobbyist as well as by the novice, and may be manufactured easily and economically (either fully assembled or in the kit form) for widespread marketing and distribution.

US PAT NO: 4,827,872 :IMAGE AVAILABLE: L7: 8 of
13
TITLE: Animal shelter

ABSTRACT:

The present invention provides an animal shelter suitably adapted for the sheltering of animals under adverse temperatures. The shelter

includes an external enclosure, an internal structure within which the animal is housed, an air passageway circumscribing the internal structure which is disposed between the internal structure and the external structure, and a **thermal** source for heating or cooling the air within the passageway. The **thermal** source may be thermostatically regulated to provide a controlled habitat environment.

US PAT NO: 4,627,903 :IMAGE AVAILABLE: L7: 9 of 13
TITLE: Electrode for an electrostatic atomizing device

ABSTRACT:
This invention relates to the fabrication of an improved electrode for an electrostatic atomizing device. The electrode consists of metal oxide-metal composite fragments dispersed and bonded in a metallic matrix. The composite fragments contain submicron metallic fibers uniformly arrayed in a nonconducting (insulating) matrix. The electrostatic atomizing device includes a cell having a chamber disposed therein, a discharge spray means in communication with the cell, at least two electrodes disposed in the chamber and being in liquid contact with the liquid in the chamber, the liquid in the chamber being transported to the discharge spray means and atomized into droplets, and a mechanism for generating by means of the electrodes, a charge through the liquid within the chamber, wherein the charge emanating from the improved electrode is sufficient to generate free excess charge in the liquid within the chamber, and the liquid is atomized into droplets.

US PAT NO: 4,398,879 :IMAGE AVAILABLE: L7: 10 of 13
TITLE: On-site fabricating of plastic pipe fittings

ABSTRACT:
A portable apparatus for reforming plastic pipe ends is disclosed. The apparatus includes a **heat** sink clamp and depth collar for locating said clamp a predetermined distance from the end of the plastic pipe end. This **heat** sink clamp substantially limits axial **heat** penetration from an oven into the plastic pipe so as to permit the reshaping of the pipe end into a sanitary flow end, i.e. an end having imperfection-free contours.

US PAT NO: 4,220,813 :IMAGE AVAILABLE: L7: 11 of 13
TITLE: Terminal for medical instrument

ABSTRACT:
A terminal is provided for introducing signals from an electrical terminal pin in a heart pacemaker to a terminal lead introduced into a patient's body. The terminal pin is disposed in a lid of the heart pacemaker so that the terminal pin is insulated from the lid. Means are also provided for introducing the signals on the terminal pin to the terminal lead without subjecting the pin to undue stresses. The terminal includes a hollow, electrically conductive ferrule disposed in concentric relationship with the terminal pin. The ferrule is

provided with a flange which is disposed against the lid. An electrical filter is disposed in the ferrule and means are provided for maintaining the filter in fixed relationship to the ferrule and the terminal. Insulating means are provided for bonding the ferrule and the terminal. An inductance may also be included in the terminal and may be connected to the filter to enhance the filtering effect. An insulating bead is disposed on the ferrule and is bonded to the ferrule to transfer stresses on the terminal pin to the bead and ferrule. The insulating bead supports an electrically conductive catheter block which fits over the electrical terminal pin and communicates electrically with the terminal pin. The catheter block also holds the terminal lead in fixed position and communicates electrically with the lead and directs the lead into the body of the patient.

US PAT NO: 4,064,740 :IMAGE AVAILABLE: L7: 12 of 13
TITLE: Apparatus and method for measuring permeability

ABSTRACT:
A material whose permeability to a fluid, such as a gas, is to be measured, forms at least part of the wall of a chamber which is otherwise impervious to the fluid, and the fluid is located within the chamber at a reference pressure level. In one embodiment, after a given interval of time, sufficient fluid is returned to the chamber to restore the pressure to its reference level. The volume of fluid required is a measure of the permeability of the material.

US PAT NO: 3,810,509 :IMAGE AVAILABLE: L7: 13 of 13
TITLE: CROSS FLOW **HEAT** EXCHANGER

ABSTRACT:
A cross flow **heat** exchanger comprising an outer structural frame, a multiplicity of channels longitudinally aligned in parallel spaced relation to form first fluid passageways within the channels, and a multiplicity of wall projection portions formed from the channel side walls and extending outwardly with load-bearing end segments of adjacent side walls abutting and transferring the channel load to the outer structural frame, the channels and wall projection portions arranged for flowing a second fluid normal to and in the space between adjacent channels, and fins extending from the channel edge walls having surface distortions.

=> s 16 not l7
L8 42 L6 NOT L7

=> s 18 and gas
451616 GAS
L9 29 L8 AND GAS

=> d 19 1-29

1. 5,690,828, Nov. 25, 1997, Apparatus and method for supercritical fluid extraction; Dale Lee Clay, et al., 210/634; 96/106; 210/97, 175, 198.2, 744; 422/63, 69 :IMAGE AVAILABLE:

2. 5,653,885, Aug. 5, 1997, Apparatus and method for supercritical

- fluid extraction; Daniel Gene Jameson, et al., 210/634; 95/87; 96/105; 210/149, 198.2, 511, 656, 742; 422/69 :IMAGE AVAILABLE:
3. 5,643,350, Jul. 1, 1997, Waste vitrification melter; J. Bradley Mason, et al., 65/158, 327, 347, 356; 588/201, 900 :IMAGE AVAILABLE:
4. 5,628,323, May 13, 1997, Ear thermometer radiation detector; Francesco Pompei, 600/475; 374/130 :IMAGE AVAILABLE:
5. 5,614,089, Mar. 25, 1997, Apparatus and method for supercritical fluid extraction or supercritical fluid chromatography; Robert W. Allington, et al., 210/198.2, 511, 634, 656, 659; 422/256, 261, 285 :IMAGE AVAILABLE:
6. 5,486,215, Jan. 23, 1996, Electrode assembly and method; Roger W. Kelm, et al., 29/623.1; 429/94 :IMAGE AVAILABLE:
7. 5,482,257, Jan. 9, 1996, Non-graphite crucible for high temperature applications; Cressie E. Holcombe, et al., 266/275, 285; 432/262 :IMAGE AVAILABLE:
8. 5,445,158, Aug. 29, 1995, Radiation detector probe; Francesco Pompei, 600/474, 549 :IMAGE AVAILABLE:
9. 5,439,760, Aug. 8, 1995, High reliability electrochemical cell and electrode assembly therefor; William G. Howard, et al., 429/94, 194, 211, 217, 219 :IMAGE AVAILABLE:
10. 5,381,796, Jan. 17, 1995, Ear thermometer radiation detector; Francesco Pompei, 600/474; 374/121, 131; 600/549 :IMAGE AVAILABLE:
11. 5,296,145, Mar. 22, 1994, Apparatus and method for supercritical fluid extraction; Robert W. Allington, et al., 210/541; 422/256 :IMAGE AVAILABLE:
12. 5,268,103, Dec. 7, 1993, Apparatus and method for supercritical fluid extraction; Daniel G. Jameson, et al., 210/634; 422/256 :IMAGE AVAILABLE:
13. 5,250,195, Oct. 5, 1993, Apparatus and method for supercritical fluid extraction; Robin R. Winter, et al., 210/634, 137; 422/256 :IMAGE AVAILABLE:
14. 5,198,197, Mar. 30, 1993, Apparatus and method for supercritical fluid extraction; Dale L. Clay, et al., 422/256; 210/634 :IMAGE AVAILABLE:
15. 5,173,188, Dec. 22, 1992, Apparatus and method for supercritical fluid extraction; Robin R. Winter, et al., 210/634; 422/256 :IMAGE AVAILABLE:
16. 5,160,624, Nov. 3, 1992, Apparatus and method for supercritical fluid extraction; Dale L. Clay, et al., 210/634; 422/256 :IMAGE AVAILABLE:
17. 4,890,667, Jan. 2, 1990, Method and apparatus for improving **heat** transfer in a fluidized bed; Delbert L. Lessor, et al., 165/287, 96, 104.16 :IMAGE AVAILABLE:
18. 4,889,506, Dec. 26, 1989, Solder delivery device; Joseph Connolly, et al., 439/874; 29/860; 174/84R; 228/56.3 :IMAGE AVAILABLE:
19. 4,674,960, Jun. 23, 1987, Sealed rotary compressor; Joseph F. Rando, et al., 417/420; 29/888.023, 888.025; 418/104, 179, 206.7, 206.8 :IMAGE AVAILABLE:
20. 4,489,593, Dec. 25, 1984, Method and apparatus for determining the amount of **gas** adsorbed or desorbed from a solid; Wim J.M. Pieters, et al., 73/38, 865.5 :IMAGE AVAILABLE:
21. 4,420,690, Dec. 13, 1983, Spectrometric microsampling **gas** cells; Donald Kuehl, 250/428, 343; 356/246 :IMAGE AVAILABLE:
22. 4,285,710, Aug. 25, 1981, Cryogenic device for restricting the pumping speed of selected gases; Kimo M. Welch, 62/55.5, 268; 417/901 :IMAGE AVAILABLE:
23. 4,217,132, Aug. 12, 1980, Method for in-flight combustion of carbonaceous fuels; Harland L. Burge, et al., 431/9; 48/DIG.2; 423/DIG.16 :IMAGE AVAILABLE:
24. 4,138,692, Feb. 6, 1979, **Gas** encapsulated cooling module; Robert G. Meeker, et al., 257/697; 165/80.4; 257/713, 714, 719 :IMAGE AVAILABLE:
25. 4,123,236, Oct. 31, 1978, **Gas** chromatograph device; T. Hirschfeld, et al., 96/104; 73/23.27 :IMAGE AVAILABLE:
26. 3,983,438, Sep. 28, 1976, Spark gap switch; Jeffrey I. Levatter, et al., 313/146, 325, 622 :IMAGE AVAILABLE:
27. 3,925,182, Dec. 9, 1975, Method for continuous production of sputter-coated glass products; Donald C. Carmichael, et al., 204/192.27; 118/718, 719; 204/192.15 :IMAGE AVAILABLE:
28. 3,904,506, Sep. 9, 1975, Apparatus for continuous production of sputter-coated glass products; Donald C. Carmichael, et al., 204/298.25, 192.26, 192.27 :IMAGE AVAILABLE:
29. 3,616,842, Nov. 2, 1971, CONTINUOUS CENTRIFUGAL CASTING OF TUBE USING LIQUID MOLD; George R. Leghorn, 164/464, 459, 476 :IMAGE AVAILABLE:
=> d 19 1-29 ti,ab
- US PAT NO: 5,690,828 :IMAGE AVAILABLE: L9: 1 of 29
TITLE: Apparatus and method for supercritical fluid extraction
ABSTRACT:

To supply supercritical fluid to an automatic supercritical fluid extractor and collect extract from the extractor, sample holding cartridges are lifted one by one in series by an elevator plug into a pressure chamber. An inlet at the top of the cartridge engages a pressure vessel inlet for the extractant so that extractant flows into the cartridge and into the space between the cartridge and inner walls of the pressure chamber. The outlets from the cartridge and pressure vessel communicate with the collector and exhaust through passageways in the plug. The plug has cleaning ports for cleaning seals and the outlet from the cartridge flows past the seals. The collector lifts vials into place and can precool the collection solvent, and later as part of the collection procedure, **heat** and pressurize the collector.

US PAT NO: 5,653,885 :IMAGE AVAILABLE: L9: 2 of 29

TITLE: Apparatus and method for supercritical fluid extraction

ABSTRACT:

To avoid deposits on the restrictor that channels extractant into a collector, a heated capillary tube pressure release restrictor, has a thermally insulated outlet end in a collecting trap substantially colder than the capillary tube. The restrictor is heated between the insulation and the capillary tube by Joulean heating. The solvent in the trap is at a pressure of 5 to 200 psi above atmospheric pressure. The **thermal**

resistance of the insulation is selected to reduce the **heat** added to the extractant to a minimum and yet cause the temperature of the extractant to be in a range within which it is sufficiently hot so it does not freeze when added to the collection solvent but not so hot as to reduce partitioning of the extract and extractant before the extractant leaves the collection solvent. It has a **thermal** **conductivity** no greater than 60 BTU's per hour, per square foot, per inch for a one degree Fahrenheit difference.

US PAT NO: 5,643,350 :IMAGE AVAILABLE: L9: 3 of 29

TITLE: Waste vitrification melter

ABSTRACT:

A glass melter for vitrifying material including radioactive and hazardous materials. In one embodiment, the melter comprises an inner vessel or container having a solidified glass skull, at least one pair of vertically-oriented, retractable electrodes, a first wall spaced apart from said inner vessel to define a dry annulus therebetween for radiatively cooling the inner vessel, and a second wall spaced apart from said first wall to define a second annulus that serves as a water jacket when filled with water. Each electrode has a protective sleeve therearound with means formed therebetween for passing a purging **gas**

therethrough. A central access nozzle allows waste material and glass formers to be fed into the inner vessel while simultaneously venting the off-**gas** generated in the inner vessel. Also, the dry annulus can have fluid circulating therethrough for regulated cooling or leak detection. An alternative embodiment contains a top entry glass tap, allowing the removal of vitrifiable material without penetrating the skull of the melter. Another embodiment provides a retractable oxygen lance which provides oxygen control to both the atmosphere above the batch and the batch itself, and a dual melt zone drain assembly which can provide

enough energy from cold startup to activate the electrodes. The drain assembly also has a separately heated nozzle which, when deenergized, prevents material from exiting the melter. The melter includes, in the preferred embodiment, a bottom electrode that can provide direct **heat** input at the drain orifice.

US PAT NO: 5,628,323 :IMAGE AVAILABLE: L9: 4 of 29

TITLE: Ear thermometer radiation detector

ABSTRACT:

A radiation detector comprises an extension shaped to be comfortably positioned in an outer ear area for obtaining temperature indications without discomfort to the subject. The extension increases non-linearly in diameter along a portion of its distal end forming a rounded distal tip. The extension is positioned in an ear canal such that the rounded tip is disposed at the opening to the ear canal. An infrared radiation sensor is positioned in the detector for receiving radiation emitted from the ear canal. An electronics unit converts the received radiation to a temperature indication.

US PAT NO: 5,614,089 :IMAGE AVAILABLE: L9: 5 of 29

TITLE: Apparatus and method for supercritical fluid extraction or supercritical fluid chromatography

ABSTRACT:

A variable-orifice fluid restrictor for use with a supercritical extractor or chromatograph includes an inlet line for fluid at a pressure above its critical pressure, an extended tubular probe having an inner and an outer surface and a proximal and a distal end. The proximal end of the probe is disposed toward the inlet line. The distal end of the probe includes an adjustable orifice means adapted for metering the fluid and having first and second orifice members and an adjusting stem having first and second ends. The adjustable orifice means is adjacent to the outer surface of the probe and the orifice means is adjustable with the adjusting stem. The end of the adjusting stem is located at the distal end of the probe and is adapted for moving the first orifice member with respect to the second orifice member to control the adjustable orifice for varying the restriction of fluid passing through the adjustable orifice.

US PAT NO: 5,486,215 :IMAGE AVAILABLE: L9: 6 of 29

TITLE: Electrode assembly and method

ABSTRACT:

An electrochemical cell and electrode assembly in which an alkali metal anode and a cathode assembly are wound together in a unidirectional winding. The anode includes an elongated strip of alkali metal which is combined with a separator material by pressing the separator material into the alkali metal under high pressure. The cathode assembly includes a cathode current collector and a cathode material bonded to the current collector at a uniform density of reactive material. The pressing of separator material into the anode can provide improved energy density in the cell.

US PAT NO: 5,482,257 :IMAGE AVAILABLE: L9: 7 of
29

TITLE: Non-graphite crucible for high temperature applications

ABSTRACT:

A multi-piece crucible for high temperature applications comprises a tubular side wall member having a lip on the inside surface and a bottom member or members forming a container for containing a melt of a material during a high temperature melt-casting operations. The multi-piece design prevents cracking of the crucible or leakage of the melt from the crucible during the melt-casting operation. The lip of the tubular member supports the bottom member. The contacting surfaces where the lip of the tubular side wall member contacts the bottom member of the multi-piece crucible contains a ceramic sealing material. The ceramic sealing material forms a **seal** sufficient to prevent the melt of the material from leaking out of the multi-piece crucible during the melt-casting process. The multi-piece crucible is made of a material which is chemically inert to the melt and has structural integrity at the melting point temperature of the melt, or of a material coated with such a material. The multi-piece crucible is contained in a **thermal** can assembly of a high temperature induction furnace during a high temperature melt-casting operation. One embodiment of the multi-piece crucible comprises a tubular member having a vertical slot filled with a ceramic sealing material to provide expansion of the tubular member without cracking during the high temperature melt-casting operation.

US PAT NO: 5,445,158 :IMAGE AVAILABLE: L9: 8 of
29

TITLE: Radiation detector probe

ABSTRACT:

Tympanic temperature measurements are obtained from the output of a radiation sensor mounted in an extension from a housing. The housing has a temperature display and supports electronics for responding to sensed radiation. The sensor is mounted in an improved extension which is shaped to fit into smaller ear canals, such as a child's ear canal or a swollen adult ear canal. Within the extension, the sensor is positioned in a highly conductive environment and receives radiation from an external target through a tube. Electronics determine the target temperature based on the sensor output signal and a temperature sensor signal.

US PAT NO: 5,439,760 :IMAGE AVAILABLE: L9: 9 of
29

TITLE: High reliability electrochemical cell and electrode assembly therefor

ABSTRACT:

An electrochemical cell and electrode assembly in which an alkali metal anode and a cathode assembly are wound together in a unidirectional winding having substantially straight sides such that the winding will fit into a prismatic cell. The anode and cathode are arranged in the winding to provide for even utilization of reactive material during cell discharge by placing cathode and anode material in close proximity throughout the electrode assembly in the proportions in which they

are utilized. The winding also contributes to even utilization of reactive material by employing multiple tabs on the cathode assembly to ensure that cathode material is evenly utilized throughout the electrode assembly during cell discharge and also so that connections to the tabs are readily made.

US PAT NO: 5,381,796 :IMAGE AVAILABLE: L9: 10 of 29

TITLE: Ear thermometer radiation detector

ABSTRACT:

A radiation detector comprises an extension shaped to be comfortably positioned in an outer ear area for obtaining temperature indications without discomfort to the subject. The extension increases non-linearly in diameter along a portion of its distal end forming a rounded distal tip. The extension is positioned in an ear canal such that the rounded tip is disposed at the opening to the ear canal. An infrared radiation sensor is positioned in the detector for receiving radiation emitted from the ear canal. An electronics unit converts the received radiation to a temperature indication.

US PAT NO: 5,296,145 :IMAGE AVAILABLE: L9: 11 of 29

TITLE: Apparatus and method for supercritical fluid extraction

ABSTRACT:

An apparatus for supercritical fluid extraction incorporates a removable extraction cartridge which in operation has insignificant pressure difference between its inside and outside walls. In one embodiment, the extractor includes a fraction collector for extractants, an automatic sample changer and an automatic cartridge transfer mechanism which provide completely automated extractions. To automatically perform extraction, valves for the fluids are automatically opened and closed in synchronism with the insertion and removal of the cartridges. These valves force a hard valve element into a softer valve seat with a valve stem that does not rotate significantly under the control of a rotary motor.

US PAT NO: 5,268,103 :IMAGE AVAILABLE: L9: 12 of 29

TITLE: Apparatus and method for supercritical fluid extraction

ABSTRACT:

To avoid deposits on the restrictor that channels extractant into a collector, a heated capillary tube pressure release restrictor, has a thermally insulated outlet end in a collecting trap substantially colder than the capillary tube. The restrictor is heated between the insulation and the capillary tube by Joulean heating. The solvent in the trap is at a pressure of 5 to 200 psi above atmospheric pressure. The **thermal**

resistance of the insulation is selected to reduce the **heat** added to the extractant to a minimum and yet cause the temperature of the extractant to be in a range within which it is sufficiently hot so it does not freeze when added to the collection solvent but not so hot as to reduce partitioning of the extract and extractant before the extractant leaves the collection solvent. It has a **thermal** **conductivity** no greater than 60 BTU's per hour, per square foot, per inch for a one degree Fahrenheit difference.

US PAT NO: 5,250,195 :IMAGE AVAILABLE: L9: 13

of 29

TITLE: Apparatus and method for supercritical fluid extraction

ABSTRACT:

An apparatus for supercritical fluid extraction incorporates a removable extraction cartridge which in operation has insignificant pressure difference between its inside and outside walls. In one embodiment, the extractor includes a fraction collector for extractants, an automatic sample changer and an automatic cartridge transfer mechanism which provide completely automated extractions. To automatically perform extraction, valves for the fluids are automatically opened and closed in synchronism with the insertion and removal of the cartridges. These valves force a hard valve element into a softer valve seat with a valve stem that does not rotate significantly under the control of a rotary motor.

US PAT NO: 5,198,197 :IMAGE AVAILABLE: L9: 14
of 29

TITLE: Apparatus and method for supercritical fluid extraction

ABSTRACT:

An apparatus for supercritical fluid extraction incorporates a removable extraction cartridge which in operation has insignificant pressure difference between its inside and outside walls. Because of the low pressure difference, the extraction cartridge need not have the strength to withstand significant pressure and can be made out of molded plastic for disposable use as well as stainless steel and/or machined plastic for reusability. The extraction cartridge can be removed and opened for sample access without the use of tools. The outside of the cartridge can be purged after it is installed in a heated high pressure vessel to remove contamination from its exterior. In one embodiment, the extractor includes a fraction collector for extractants, an automatic sample changer and an automatic cartridge transfer mechanism which provide completely automated extractions.

US PAT NO: 5,173,188 :IMAGE AVAILABLE: L9: 15
of 29

TITLE: Apparatus and method for supercritical fluid extraction

ABSTRACT:

An apparatus for supercritical fluid extraction incorporates a removable extraction cartridge which in operation has insignificant pressure difference between its inside and outside walls. In one embodiment, the extractor includes a fraction collector for extractants, an automatic sample changer and an automatic cartridge transfer mechanism which provide completely automated extractions. To automatically perform extraction, valves for the fluids are automatically opened and closed in synchronism with the insertion and removal of the cartridges. These valves force a hard valve element into a softer valve seat with a valve stem that does not rotate significantly under the control of a rotary motor.

US PAT NO: 5,160,624 :IMAGE AVAILABLE: L9: 16
of 29

TITLE: Apparatus and method for supercritical fluid extraction

ABSTRACT:

An apparatus for supercritical fluid extraction incorporates a removable extraction cartridge which in operation has insignificant pressure difference between its inside and outside walls. Because of the low pressure difference, the extraction cartridge need not have the strength to withstand significant pressure and can be made out of molded plastic for disposable use as well as stainless steel and/or machined plastic for reusability. The extraction cartridge can be removed and opened for sample access without the use of tools. The outside of the cartridge can be purged after it is installed in a heated high pressure vessel to remove contamination from its exterior. In one embodiment, the extractor includes a fraction collector for extractants, an automatic sample changer and an automatic cartridge transfer mechanism which provide completely automated extractions.

US PAT NO: 4,890,667 :IMAGE AVAILABLE: L9: 17
of 29

TITLE: Method and apparatus for improving **heat** transfer in a fluidized bed

ABSTRACT:

An apparatus contains a fluidized bed that includes particles of different triboelectrical types, each particle type acquiring an opposite polarity upon contact. The contact may occur between particles of the two types or between particles of either type and structure or fluid present in the apparatus. A fluidizing **gas** flow is passed through the particles to produce the fluidized bed. Immersed within the bed are electrodes. An alternating EMF source connected to the electrodes applies an alternating electric field across the fluidized bed to cause particles of the first type to move relative to particles of the second type and relative to the **gas** flow. In a **heat** exchanger incorporating the apparatus, the electrodes are conduits conveying a fluid to be heated. The two particle types alternately contact each conduit to transfer **heat** from a hot **gas** flow to the second fluid within the conduit.

US PAT NO: 4,889,506 :IMAGE AVAILABLE: L9: 18
of 29

TITLE: Solder delivery device

ABSTRACT:

A self-contained solder delivery device comprises a housing, a quantity of solder together with flux and a pressuring means for forcing the solder from the housing. The device can be used in a connector for use in connecting the conductors of electric power cables.

US PAT NO: 4,674,960 :IMAGE AVAILABLE: L9: 19
of 29

TITLE: Sealed rotary compressor

ABSTRACT:

A sealed rotary compressor is provided which includes separate pump and gear chambers. Disposed within the pump chamber is a set of rotors operatively associated with a set of gears rotatably mounted within the gear chamber. A substantially pressure differential exists between the

two chambers. Rotational power is applied directly to the rotors through a static **seal** rather than through the gears which are utilized primarily to transmit the dynamic load. The pump chamber is defined by two end plates with a surrounding thin-walled housing. Within the chamber are interior thin wall members with the rotary members disposed therebetween and defining inlet and outlet pockets operatively associated with a pump housing inlet and outlet means. The combination of pump and gear chambers are disposed within a separate pressure vessel whereby **gas** is introduced through the pressure vessel into the pump chamber and is expelled from the pump chamber into the interior of the pressure vessel from where it is expelled to a desired apparatus. The present invention is particularly suitable for applications with CO₂ axial-flow lasers.

US PAT NO: 4,489,593 :IMAGE AVAILABLE: L9: 20
of 29
TITLE: Method and apparatus for determining the amount of
gas adsorbed or desorbed from a solid

ABSTRACT:
Methods for determining the amount of a **gas** adsorbed or desorbed from a solid sample wherein a **gas** is introduced or withdrawn from a containing chamber at a substantially constant mass flow rate while measuring the pressure change within said chamber as a function of time is disclosed. An apparatus for conducting said method which uses a mass flow controller is also disclosed.

US PAT NO: 4,420,690 :IMAGE AVAILABLE: L9: 21
of 29
TITLE: Spectrometric microsampling **gas** cells

ABSTRACT:
A sample cell for absorption spectrometry of small volume samples in a continuously flowing carrier **gas** stream is in the form of an elongate small-bore hollow tube with optically transparent end windows -sealed to the tube and held so as to axially captivate the tube within a through-bore in a rigid, thermally conducting, holder. Radial openings through the tube proximate the window **seal**, together with matching bores in the holder, are provided to accommodate fluid transfer lines. The transfer lines are resiliently sealed to tube and holder to permit differential expansion between tube and holder.

US PAT NO: 4,285,710 :IMAGE AVAILABLE: L9: 22
of 29
TITLE: Cryogenic device for restricting the pumping speed of selected gases

ABSTRACT:
In an apparatus for removing a selected first **gas** from a chamber at a controllably variable pumping speed while maintaining a substantially constant pumping speed for removing a second **gas** from the

same chamber, a flow restricting device is disposed between the chamber and a device that pumps the first **gas**. The flow restricting device comprises a stationary member having an apertured portion through which the first **gas** can flow from the chamber to the pumping device. Restriction of the flow of the first **gas** to the pumping device is accomplished by covering the apertured portion of the stationary member with a movable member to the extent necessary to provide the desired pumping speed for the first **gas**. The stationary member is maintained at a cryogenic temperature higher than the condensation temperature of the first **gas**, but at a value at which the second **gas** condenses. In one embodiment, the stationary member is maintained at the desired cryogenic temperature by being mounted in intimate **thermal** contact with a cryogenic fluid reservoir. In an alternative embodiment, the stationary member is mounted in intimate **thermal** contact with the warmer stage of a two-stage cryogenic pump.

US PAT NO: 4,217,132 :IMAGE AVAILABLE: L9: 23
of 29
TITLE: Method for in-flight combustion of carbonaceous fuels

ABSTRACT:
An apparatus and method for combusting carbonaceous fuels includes a reaction chamber defining a reaction zone and means for injecting fuel and oxidizer **gas** in a manner to produce in the reaction zone a wheel-type flow of the fuel-**gas** mixture. In preferred embodiments, the high velocity wheel-type flow operates to suspend fuel or other reactant particles in the swirling **gas** for residence times required for substantially complete reaction of the particles prior to the particles impinging against the walls of the reaction chamber. High angular velocities and the resulting centrifugal forces operate to remove substantially all slag from the **gas** as it approaches the downstream end of the reaction chamber. Operating temperatures are maintained at a level to avoid excessive volatilization of slag and thereby promote separation of liquid slag from the gaseous reaction products. Dense phase flow is employed for transporting pulverized reactants such as coal to the reaction chamber and injecting the reactants through a pintle fuel injector.

US PAT NO: 4,138,692 :IMAGE AVAILABLE: L9: 24
of 29
TITLE: **Gas** encapsulated cooling module

ABSTRACT:
A **gas** encapsulated cooling module wherein at least one semiconductor chip to be cooled is supported on a substrate portion of the module the provision of a **heat** sink stud having a planar surface in **thermal** contact with a planar surface of the chip to be cooled, said stud being supported by a resilient thermally conductive bellow-like structure, whereby the planar surface of the stud is maintained in intimate **thermal** contact with the planar surface of the chip.

US PAT NO: 4,123,236 :IMAGE AVAILABLE: L9: 25
of 29
TITLE: **Gas** chromatograph device

ABSTRACT:

An improved high resolution chromatograph device operable at column pressures ranging between one and fifty atmospheres absolute measured at the column exit, means for closely regulating the column carrier **gas** velocity including intermittent stop flow operation, and sample collection chamber means to facilitate contamination free handling and concentration of collected pure sample during spectral or other analysis of eluted samples. Velocity and stop flow control without loss of chromatographic resolution permits matching operation time of chromatograph to that of spectral or other analysis devices.

US PAT NO: 3,983,438 :IMAGE AVAILABLE: L9: 26
of 29
TITLE: Spark gap switch

ABSTRACT:

A spark gap switch having a central electrode positioned within an annular electrode in a dielectric liquid or saturated vapor flow line, with coaxial or parallel plate electrical connections to said electrodes.

US PAT NO: 3,925,182 :IMAGE AVAILABLE: L9: 27
of 29
TITLE: Method for continuous production of sputter-coated glass products

ABSTRACT:

A method and apparatus for the continuous production of sputter-coated glass products; such as glass sheets, or other substrates, involving supporting one or more substrates to be coated on a rigid support-platen, passing the platens and substrates horizontally through a series of successive chambers aligned with one another, including an entrance chamber, a coating chamber and a discharge chamber, sealing compartments at the opposite ends of the coating chamber, at the entry end of the entrance chamber and at the exit end of the discharge chamber for sealing said chambers from one another and from the atmosphere, conveyor means in said chambers for carrying the platens and substrates therethrough, and means responsive to movement of the platens through said chambers for automatically and in timed sequence initiating and controlling the complete cycle of operations of the apparatus, including the travel of the platens through the successive chambers, the opening and closing of the sealing compartments and the sputter-coating of one or more continuous films of a selected material or materials on the substrates as they pass through the coating chamber.

US PAT NO: 3,904,506 :IMAGE AVAILABLE: L9: 28
of 29
TITLE: Apparatus for continuous production of sputter-coated glass products

ABSTRACT:

A method and apparatus for the continuous production of sputter-coated

glass products; such as glass sheets, or other substrates, involving supporting one or more substrates to be coated on a rigid support-platen, passing the platens and substrates horizontally through a series of successive chambers aligned with one another, including an entrance chamber, a coating chamber and a discharge chamber, sealing compartments at the opposite ends of the coating chamber, at the entry end of the entrance chamber and at the exit end of the discharge chamber for sealing said chambers from one another and from the atmosphere, conveyor means in said chambers for carrying the platens and substrates therethrough, and means responsive to movement of the platens through said chambers for automatically and in timed sequence initiating and controlling the complete cycle of operations of the apparatus, including the travel of the platens through the successive chambers, the opening and closing of the sealing compartments and the sputter-coating of one or more continuous films of a selected material or materials on the substrates as they pass through the coating chamber.

US PAT NO: 3,616,842 :IMAGE AVAILABLE: L9: 29
of 29
TITLE: CONTINUOUS CENTRIFUGAL CASTING OF TUBE USING LIQUID MOLD

ABSTRACT:

Continuous centrifugal casting of metal tube on a centrifuged lining of a heavier liquid metal mold, (as lead, tin, or lead-tin alloy). Both the liquid mold material and the molten metal, to be cast to tube, are continuously introduced into the starting end of the centrifuge and continuously exit from the opposite end where the still liquid mold material flows into a suitable catch-ring for recirculation and the semisolidified or solidified centrifugally cast tube exits axially from the centrifuge for subsequent use as tube or as a basic hollow cylinder for conversion to longitudinal structural items by the technique of collapse deformation.

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- L1. 12 S E4
- L2. 0 S HOLDING BODY AND APERATURE? ABD
SEAL?
- L3. 202 S APERATURE AND CONDUCTIVITY
- L4. 0 S L3 AND HEAT TRANSFERRING SEAL
- L5. 66 S L3 AND SEAL
- L6. 55 S L5 AND (THERMAL OR HEAT)
- L7. 13 S L6 AND ADHESIVE
- L8. 42 S L6 NOT L7
- L9. 29 S L8 AND GAS